



550 N. 31st Street, Ste. 500
P.O. Box 7168
Billings, MT 59101

May 20, 2014

NSR Program Manager/Attn: O&G Production Facilities
Wyoming Dept. of Environmental Quality
Air Quality Division
Herschler Bldg., 2-E
122 West 25th St
Cheyenne, WY 82002



Re: Permit Applications for Roger Leo Fed 3875-20-29-1FH and Spearhead Fed 14-7H

Dear Permitting Engineer:

SM Energy Company respectfully submits the following permit applications for the Roger Leo Fed and the Spearhead Fed. Both of the permit applications were submitted electronically and this envelope includes the additional paper copy with original signature.

Please contact us with any questions or concerns.

Respectfully,

Luke Studer

SM Energy Company

Reviewer HMB
cc: _____
Modeler _____
D.E. _____
File A0001133
IMP FID F026612
Roger LEO



Department of Environmental Quality Air Quality Division Permit Application Form



Is this a revision to an existing application?

Yes _____

No ☒ X

Date of Application: 5/21/2015

Previous Application #:

COMPANY INFORMATION:

Company Name: SM Energy Co.

Address: 550 North 31st Street Suite 500

City: Billings State: Montana Zip Code: 59103

Country: USA Phone Number: 4068698706

FACILITY INFORMATION:

Facility Name: Roger Leo Federal 3875-20-29-1FH

New Facility or Existing Facility: ☒ New

Facility Description: Oil and Gas Production Facility

Facility Class: Minor Operating Status: Operating

Facility Type: Production Site

For Oil & Gas Production Sites ONLY:

First Date of Production (FDOP)/Date of Modification: April 2, 2015

Does production at this facility contain H2S? ☒ No

**If yes, contact the Division.*

API Number(s): 49-009-29320

NAICS Code: 211111 Crude Petroleum and Natural Gas Extraction

FACILITY LOCATION:**Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.*

Physical Address:

City: _____ Zip Code: _____

State: WY County: _____

OR

Latitude: 43.25716 Longitude: -105.88214 County: Converse

Quarter Quarter: NE Quarter: NE

Section: 20 Township: 38N Range: 75W

*For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***CONTACT INFORMATION:****Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.*

Title: Mr. First Name: Luke

Last Name: Studer

Company Name: SM Energy Co

Job Title: Sr. EH&S Specialist

Address: 550 North 31st Street Suite 500

City: Billings State: Montana

Zip Code: 59103

Primary Phone No.: 406-869-8706 E-mail: lstuder@sm-energy.com

Mobile Phone No.: _____ Fax No.: _____

Contact Type: Environmental contact Start Date: _____

Additional Contact Type (if needed):

Title: First Name:
 Last Name:
 Company Name:
 Job Title:
 Address:
 City: State:
 Zip Code:
 Primary Phone No.: E-mail:
 Mobile Phone No.: Fax No.:
 Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:**General Info:**

Has the facility changed location or is it a new/ greenfield facility?
 Has a Land Use Planning document been included in this application?
 Is the facility located in a sage grouse core area?*

Yes
No
No

If the facility is in a sage grouse core area, what is the WER number?

* For questions about sage grouse core area, contact WY Game & Fish Department.

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):

No
No

Non-Attainment New Source Review:

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?
 Is a modeling analysis part of this application?

No
No

Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?

Has the Air Quality Division been notified to schedule a pre-application meeting?

Has a modeling protocol been submitted to and approved by the Air Quality Division?

Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?


No
No
No
No

Required Attachments:

Facility Map	<input checked="" type="checkbox"/>
Process Flow Diagram	<input type="checkbox"/>
Modeling Analysis (if applicable)	<input type="checkbox"/>
Land Use Planning Document	<input type="checkbox"/>
Detailed Project Description	<input checked="" type="checkbox"/>
Emissions Calculations	<input checked="" type="checkbox"/>

I, Luke Studer Sr. EH&S Specialist
 Responsible Official (Printed Name) Title

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: 
 (ink)

Date:

Company Name

SM Energy

Facility Name

Roger Leo Federal

Process Description

The Roger Leo Federal 3875-20-29-1FH is powered by a generator (previously permitted: P0005290) to run the pumping unit and facility.

The fluid stream containing natural gas, crude oil and produced water is routed to the vertical treater. The treater has a 0.75 MMBtu/hr heater. Three streams are generated in the treater including gas, oil, and water.

The crude oil stream is sent to one of the eight oil tanks. The tank vapor emissions are captured and sent to the low pressure tip of the Steffes flare (on-site). The combustion efficiency is estimated at 98 percent. The crude oil is hauled offsite by tank trucks.

The gas phase stream leaves the separator and is sent offsite to a pipeline owned by a third party. The stream is also used to fuel the vertical treaters burner if additional fuel is needed. If the gas cannot be sent to the sales line, it will be sent to the high pressure tip of the Steffes flare (considered an emergency situation).

The water is sent to two 400-barrel aboveground storage tanks and sent off site by truck. Since little water is produced and the water is from a treated stream, emissions are assumed to be minimal.

Fugitive emissions are associated with the valves, gauges, tank vents, hatches and connectors at the site. The components were estimated based on similar facilities. An exact component count was not performed.



STATE OF WYOMING
Department of Environmental Quality - Air Quality Division
Oil and Gas Production Facilities C6 S2 Permit Application



Equipment List

Company Name SM Energy
Facility Name Roger Leo Federal

List all production equipment at the site including all pressurized vessels with the potential for flash emissions, all hydrocarbon liquids and produced water storage tanks, all dehydration units, all pneumatic pumps, all natural gas-fired burners and heaters and all emission control equipment and devices. Pressurized vessels with the potential for flash emissions are all vessels that vent vapors to the atmosphere during times other than upset or emergency conditions (water knockouts, 2-phase and 3-phase separators, heater treaters, gun barrels, scrubber pots, etc). Provide design ratings for dehys (MMCFD), process heaters, burners and pilots (MMBtu/hr, SCFH). Provide size of production & water storage tanks (BPD). For dehydration units indicate if the unit includes a glycol flash separator and/or reboiler still vent condenser. For emission control combustors/flares indicate design rating (MMBtu/hr, SCFD) and combustor/flare height (ft). Provide pneumatic pump motive gas usage (SCFH).

2 400-bbl water tank

8 400-bbl oil tanks (controlled by combustor)

1 6' x 20' vertical treater with 0.75 MMBtu heater

1 rotaflex pump with associated generator (already permitted: P0005290)

1 Steffes combination flare with a low pressure tip for tank vapors and higher pressure for emergencies when produced gas cannot go to sales line

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: Roger Fed Heater Treater heater

Company Equipment Description: Heater Treater heater

Operating Status: Operating

Initial Construction Commencement Date: Oct 2014 - Feb 2015

Initial Operation Commencement Date: 4/2/15

Most Recent Construction/ Modification

Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Firing Type:

Direct

Heat Input Rating: 0.75

Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Heat Content of Fuel: 1270

Units: BTU/scf

Fuel Sulfur Content: 0

Units: ppm

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310010100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

Yes No X

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

Yes No X

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Criteria Pollutants:

1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)						
2.)	PM #10 microns in diameter (PE/PM10)						
3.)	PM #2.5 microns in diameter (PE/PM2.5)						
4.)	Sulfur dioxide (SO2)		0.0006	lb/MMBtu	0.0004	0.0019	AP-42
5.)	Nitrogen Oxides (NOx)		0.10	lb/MMBtu	0.07	0.32	AP-42
6.)	Carbon monoxide (CO)		0.08	lb/MMBtu	0.06	0.27	AP-42
7.)	Volatile organic compounds (VOC)		0.01	lb/MMBtu	0.00	0.02	AP-42
8.)	Lead (Pb)						
9.)	Total Hazardous Air Pollutants (HAPs)		See attached		0.00	0.01	AP-42
10.)	Fluoride (F)						
11.)	Hydrogen Sulfide (H2S)						
12.)	Mercury (Hg)						
13.)	Total Reduced Sulfur (TRS)						
14.)	Sulfuric Acid Mist (SAM)						

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminants

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	See Attached						
2.)							
3.)							
4.)							
5.)							
6.)							
7.)							
8.)							

Greenhouse Gases (GHGs)

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)							
2.)							
3.)							
4.)							
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Separator/Treater

Company Equipment ID: Roger Leo Federal Heater Treater

Company Equipment Description: Heater Treater

Operating Status: Operating

Initial Construction Commencement Date: Oct 2014 - Feb 2015

Initial Operation Commencement Date: 4/2/2015

Most Recent Construction/ Modification

Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Type of Vessel: Heater-Treater

Is Vessel Heated?

Yes

Operating Temperature (F): 80-145

Operating Pressure (psig): 25-75

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

31000129

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

Yes

No

X

Pollutant: _____

Proposed BACT: Presumptive BACT- Smokeless Combustor 98% control, but all gas is typically sold

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

Yes

No

X

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:**Storage Tank/Silo**

Company Equipment ID: Roger Leo Federal Crude Oil Tanks 1-8

Company Equipment Description: Crude Tanks 1-8

Operating Status: Operating

Initial Construction Commencement Date: Oct 2014 - Feb 2015

Initial Operation Commencement Date: Apr-15

Most Recent Construction/ Modification

Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Material Type: Liquid

Description of Material Stored: Crude Oil from Oil well production

Capacity: 400

Units: barrels

Maximum Throughput: 513.92

Units: barrels/day

Maximum Hourly Throughput: 42.83

Units: barrels/hr

Operating Pressure (psig): Atmosphere

Vapor Pressure of Material Stored (psig): RVP 5.4

Is Tank Heated?: No

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310010200

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: ☐ Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?
Yes No

Pollutant: _____

Proposed BACT: Presumptive BACT- Smokeless Combustor 98% control

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?
Yes No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): ☐ Not Affected

New Source Performance Standards are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): ☐ Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): ☐ Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Storage Tank/Silo

Company Equipment ID: Roger Leo Federal Produced Water Tanks

Company Equipment Description: Produced Water 1, Produced Water 2

Operating Status: Operating

Initial Construction Commencement Date: Oct 2014 - Feb 2015

Initial Operation Commencement Date: Apr-15

Most Recent Construction/ Modification

Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Material Type: Liquid

Description of Material Stored: Produced water from oil well production

Capacity: 400

Units: barrels

Maximum Throughput: 718

Units: barrels/day

Maximum Hourly Throughput: 59.83

Units: barrels/hr

Operating Pressure (psig): Atmosphere

Vapor Pressure of Material Stored (psig): 1 (water)

Is Tank Heated?:

No

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310010200

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: ☐ Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?
Yes ☐ No ☒

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?
Yes ☐ No ☒

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): ☐ Not Affected

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): ☐ Not Affected

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR
61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): ☐ Not Affected

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:**Flare/Combustor**

Manufacturer: Steffes Date Installed: Oct 2014 - Feb 2015
 Model Name and Number: Dual Tip (low and high pressure) Company Control Equipment ID: Roger Leo Federal Flare
 Company Control Equipment Description: Roger Leo Federal tank vapor and emergency gas flare

Pollutant(s) Controlled:	CO	NOx	Pb	SO2	VOC	PM
	PM (FIL)	PM Condensable	PM 10 (FIL)	PM 2.5 (FIL)	PM 10	PM 2.5
	Other HAPs					

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Maximum Design Capacity (MMSCF/hr): High pressure tip 1.1, low 0.006 MMscf/hr
 Minimum Design Capacity (MMSCF/hr): High pressure tip 0.0011, low 4.4 scf/hr
 Design Control Efficiency (%): 98 Capture Efficiency (%): _____
 Operating Control Efficiency (%): 98
 Flare Type:* Elevated- Open Elevated Flare Type:* Non-Assisted
 Ignition Device:* Yes Flame Presence Sensor:* Yes
 Inlet Gas Temp (F): ambient at 90F Flame Presence Type:* Other
 Gas Flow Rate (acfm): varies Outlet Gas Temp (F): 900
 This is the only control equipment on this air contaminant source ☒ ☐ ☐
 If not, this control equipment is: Primary Secondary Parallel

List all other emission units that are also vented to this control equipment:*

List all release point IDs associated with this control equipment: * This Flare controls tank vapors, and associated gas in emergency situations when it can not be sold (or consumed by the treater heater). Tanks & Heater Treater (in emergencies)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Criteria Pollutants:

1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)						
2.)	PM #10 microns in diameter (PE/PM10)						
3.)	PM #2.5 microns in diameter (PE/PM2.5)						
4.)	Sulfur dioxide (SO2)						
5.)	Nitrogen Oxides (NOx)		0.14	lb/MMBtu	1.12	4.894765	AP-42
6.)	Carbon monoxide (CO)		0.37	lb/MMBtu	2.95	12.93616	AP-42
7.)	Volatile organic compounds (VOC)	1436.37			6.56	28.7274	Tanks Program
8.)	Lead (Pb)						
9.)	Total Hazardous Air Pollutants (HAPs)	42.97			0.20	0.8594	Tanks Program
10.)	Fluoride (F)						
11.)	Hydrogen Sulfide (H2S)						
12.)	Mercury (Hg)						
13.)	Total Reduced Sulfur (TRS)						
14.)	Sulfuric Acid Mist (SAM)						

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminants

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	See Attached					
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Greenhouse Gases (GHGs)

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)						
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Specific Emission Unit Attributes:

Fugitives

Company Equipment ID: Roger Leo Federal Fugs
Company Equipment Description: Fugitive Emissions

Operating Status: Operating
Initial Construction Commencement Date: Oct 2014 - Feb 2015
Initial Operation Commencement Date: Apr-15
Most Recent Construction/ Modification
Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Type of Fugitive Emission: Fugitive Leaks at O&G

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

31088811

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment: ☐ No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?
Yes ☐ No ☒

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?
Yes ☐ No ☒

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): ☐ Not Affected

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): ☐ Not Affected

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61.
(These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): ☐ Not Affected

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: ☐ Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Criteria Pollutants:

1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)					
2.)	PM #10 microns in diameter (PE/PM10)					
3.)	PM #2.5 microns in diameter (PE/PM2.5)					
4.)	Sulfur dioxide (SO2)					
5.)	Nitrogen Oxides (NOx)					
6.)	Carbon monoxide (CO)					
7.)	Volatile organic compounds (VOC)			1.00	4.36	Other
8.)	Lead (Pb)					
9.)	Total Hazardous Air Pollutants (HAPs)			0.15	0.66	Other
10.)	Fluoride (F)					
11.)	Hydrogen Sulfide (H2S)					
12.)	Mercury (Hg)					
13.)	Total Reduced Sulfur (TRS)					
14.)	Sulfuric Acid Mist (SAM)					

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminants

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	NA					
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Greenhouse Gases (GHGs)

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	NA					
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Specific Emission Unit Attributes:

Loading/Unloading/Dump

Company Equipment ID: Roger Leo Federal Truck Loading

Company Equipment Description: Loading

Operating Status: Operating

Initial Construction Commencement Date: Oct 2014 - Feb 2015

Initial Operation Commencement Date: Apr-15

Most Recent Construction/ Modification

Commencement Date: NA

Most Recent Operation Commencement Date: NA

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Construction (Greenfield/New Facility)

If reason is **Reconstruction** or **Temporary Permit** or **Other**, please explain below:

Type of Material: Liquid

Material Description: Crude Oil and Produced Water

Maximum Annual Throughput: 95300

Units: barrels/yr

Maximum Hourly Throughput: 85

Units: barrels/hr

Detailed Description of Loading/Unloading/Dump Source:

Crude Oil and Produced water from oil well

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310010800

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 4

Hours/year: 1460

Control Equipment:

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

☐☒

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

Yes

No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

☐☒

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

Yes

No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS):

*New Source Performance Standard are listed under 40 CFR 60-
Standards of Performance for New Stationary Sources.*

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61):

*National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61.
(These include asbestos, benzene, beryllium, mercury, and vinyl chloride).*

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63):

*National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63)
standards are listed under 40 CFR 63*

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD):

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review:

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Criteria Pollutants:

1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)					
2.)	PM #10 microns in diameter (PE/PM10)					
3.)	PM #2.5 microns in diameter (PE/PM2.5)					
4.)	Sulfur dioxide (SO2)					
5.)	Nitrogen Oxides (NOx)					
6.)	Carbon monoxide (CO)					
7.)	Volatile organic compounds (VOC)	1.366**		7.37	5.38	AP-42
8.)	Lead (Pb)					
9.)	Total Hazardous Air Pollutants (HAPs)			1.11	0.81	AP-42
10.)	Fluoride (F)					
11.)	Hydrogen Sulfide (H2S)					
12.)	Mercury (Hg)					
13.)	Total Reduced Sulfur (TRS)					
14.)	Sulfuric Acid Mist (SAM)					

***Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.**

** lb/1000 gallons, uncontrolled PTE based on operating 8760 hours

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminants

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	NA					
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Greenhouse Gases (GHGs)

Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards		Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
	Potential to Emit (PTE)	Units			

Pollutants:

1.)	NA					
2.)						
3.)						
4.)						
5.)						
6.)						
7.)						
8.)						

Release Point Information:

Complete the table below for *each* release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside) air. List each individual release point on a separate pair of lines (release point ID and description). *For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)*

Stack Release Point Information		
Company Release Point ID:	Release Point Type:	Vertical
Controlled Tank & Emergency gas Emissions	Release Point Latitude:	43.25716
	Release Point Longitude:	-105.789419
Company Release Point Description:	Base Elevation (ft):	5576
Tank vapor and Associated gas combustor emissions	Stack Height (ft):	20
	Stack Diameter (ft):	0.25
	Exit Gas Velocity (ft/s):	300
	Exit Gas Temp (F):	900
	Exit Gas Flow Rate (acfm):	1178
Company Release Point ID:	Release Point Type:	Vertical
Heater Treater heater	Release Point Latitude:	43.25716
	Release Point Longitude:	-105.789419
Company Release Point Description:	Base Elevation (ft):	5198
	Stack Height (ft):	20
	Stack Diameter (ft):	1
	Exit Gas Velocity (ft/s):	7.2
	Exit Gas Temp (F):	575
	Exit Gas Flow Rate (acfm):	340
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fugitive Release Point Information	
Company Release Point ID:	Release Point Latitude: 43.25716
Fugs	Release Point Longitude: -105.88214
Company Release Point Description:	Release Height (ft): between 1 and 30
Fugitives, which by definition do not have a point, volume or line	
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
Company Release Point Description:	Release Height (ft): _____
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
Company Release Point Description:	Release Height (ft): _____
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
Company Release Point Description:	Release Height (ft): _____

SM ENERGY
Roger Leo Federal
COMBUSTION EMISSIONS

Compound	Emission Factor (lb/10 ⁶ ft ³)	Emission Factor (lb/MMBtu)	Treaters - 0.75 MMBtu/hr PTE (TPY)	Emission Factor Source
CO	84	0.082352941	0.271	AP-42 Table 1.4-1
NO _x	100	0.098039216	0.322	AP-42 Table 1.4-1
SO ₂	0.6	0.000588235	0.002	AP-42 Table 1.4-2
VOC	5.5	0.005392157	0.018	AP-42 Table 1.4-2
Total HAPs	--	--	0.006	--
2-Methylnaphthalene	2.4E-05	2.4E-08	7.7E-08	AP-42 Table 1.4-3
3-Methylchloranthrene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.6E-08	5.2E-08	AP-42 Table 1.4-3
Acenaphthene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Acenaphthylene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Anthracene	2.4E-06	2.4E-09	7.7E-09	AP-42 Table 1.4-3
Benz(a)anthracene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Benzene	2.1E-03	2.1E-06	6.8E-06	AP-42 Table 1.4-3
Benzo(a)pyrene	1.2E-06	1.2E-09	3.9E-09	AP-42 Table 1.4-3
Benzo(b)fluoranthene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Benzo(g,h,i)perylene	1.2E-06	1.2E-09	3.9E-09	AP-42 Table 1.4-3
Benzo(k)fluoranthene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Chrysene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Dibenzo(a,h)anthracene	1.2E-06	1.2E-09	3.9E-09	AP-42 Table 1.4-3
Dichlorobenzene	1.2E-03	1.2E-06	3.9E-06	AP-42 Table 1.4-3
Fluoranthene	3.0E-06	2.9E-09	9.7E-09	AP-42 Table 1.4-3
Fluorene	2.8E-06	2.7E-09	9.0E-09	AP-42 Table 1.4-3
Formaldehyde	7.5E-02	7.4E-05	2.4E-04	AP-42 Table 1.4-3
Hexane	1.8E+00	1.8E-03	5.8E-03	AP-42 Table 1.4-3
Indeno(1,2,3-cd)pyrene	1.8E-06	1.8E-09	5.8E-09	AP-42 Table 1.4-3
Naphthalene	6.1E-04	6.0E-07	2.0E-06	AP-42 Table 1.4-3
Phenanthrene	1.7E-05	1.7E-08	5.5E-08	AP-42 Table 1.4-3
Pyrene	5.0E-06	4.9E-09	1.6E-08	AP-42 Table 1.4-3
Toluene	3.4E-03	3.3E-06	1.1E-05	AP-42 Table 1.4-3
Arsenic	2.0E-04	2.0E-07	6.4E-07	AP-42 Table 1.4-4
Beryllium	1.2E-05	1.2E-08	3.9E-08	AP-42 Table 1.4-4
Cadmium	1.1E-03	1.1E-06	3.5E-06	AP-42 Table 1.4-4
Chromium	1.4E-03	1.4E-06	4.5E-06	AP-42 Table 1.4-4
Cobalt	8.4E-05	8.2E-08	2.7E-07	AP-42 Table 1.4-4
Manganese	3.8E-04	3.7E-07	1.2E-06	AP-42 Table 1.4-4
Mercury	2.6E-04	2.5E-07	8.4E-07	AP-42 Table 1.4-4
Nickel	2.1E-03	2.1E-06	6.8E-06	AP-42 Table 1.4-4
Selenium	2.4E-05	2.4E-08	7.7E-08	AP-42 Table 1.4-4

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~~CONTROLLED TANK EMISSIONS~~

CO and NOx Emissions From Combustion of Tank Vapors

Compound	Emission Factor (lb/MMBtu)	Throughput MMBtu/yr	Controlled Emissions (TPY)	Emission Factor Source
CO	0.37	69,925	12.936	AP-42 Table 13.5-1
NO _x	0.14	69,925	4.895	AP-42 Table 13.5-1

HC Vapor emissions (MSCFD) = 70.4800

Gas Heat Content (Btu/SCF) = 2,718.16

Annual heat throughput (Btu/yr) = 69,925,209,632

* Both the throughput and heat content are from the E&P TANKS results - attached.

VOC and HAPs Emissions From Combustion of Tank Vapors

Compound	Throughput (TPY)	Burner Control Efficiency (%)	Controlled Emissions (TPY)	Emission Factor Source
VOC	1436.37	98	28.727	WY Oil and Gas Guidance -2010
HAPs	42.97	98	0.859	WY Oil and Gas Guidance -2010

Emissions are based on 98% control efficiency.

Production values put in E&P TANKS is incorporating a decline curve of 0.6 to account for the decrease in production during the first year

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FUGITIVE EMISSIONS

Component Source Counts				
Equipment Type	Storage Tank	Wellhead	Separator	Heater-treater
Number of units	10	1	1	1
Valves	6	5	6	8
Flanges	4	10	12	12
Connectors	20	4	10	20
Open-ended lines	2	0	0	0
Other components	2	1	0	0

Emissions				
Total Component Count	Hydrocarbon EF (lb/component-day)	TPY HC	HC VOC Wt. Fraction	TPY VOCs
Valves	84	0.13	1.99	1
Flanges	84	0.0058	0.09	1
Connectors	238	0.011	0.48	1
Open-ended lines	20	0.074	0.27	1
Other components	21	0.4	1.53	1
Total	447		4.36	

Total HCs = 4.36 TPY
 Total VOC's = 4.36 TPY
 Total VOC's = 1.00 lb/hr
 Total HAPs = 0.66 TPY
 Total HAPs = 0.15 lb/hr

- Component counts were derived from Table W-1C of Subpart W (Oil and Natural Gas Systems) of 40 CFR Part 98 for Western U.S. oil production equipment for wellheads and heater treater. Tank components are based on engineering estimates.
- Emission Factors (in lb/component-day) from Wyoming Air Quality Division Oil and Gas Permitting Guidance, 2007
- Light Oil VOC Weight fraction assumed to be 1.0 to be conservative
- To be conservative, all Speciated Fugitive Emission Factors (Wt Fractions) from light crude - Wyoming Air Quality Division Oil and Gas Permitting Guidance, 2007 (HAP Fraction of Hydrocarbon Emissions 0.2585)
- Total HAPs calculated by multiplying Total HCs in TPY by weight fraction HAPs

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LOADING EMISSIONS

Truck Loading Emission Methodology

$$L_L = 12.46 \times \frac{SPM}{T}$$

Where:

- L_L = loading loss (lb/1,000 gallon liquid loaded)
 S = saturation factor (AP-42 Table 5.2-1)
 P = true vapor pressure of liquid loaded (psia), (from AP-42 Table 7.1-2)
 M = molecular weight of vapor (Table 7.1-2)
 T = Temperature of liquid loaded ($^{\circ}R = 460 + ^{\circ}F$)

Variables		Source
S	0.6	AP-42 Table 5.2-1 (Submerged loading: dedicated normal service)
P (psia)	1.9	AP-42 Table 7.1-2 (Crude Oil RVP 5 at 40F)
M (lb/lbmole)	50	AP-42 Table 7.1-2 (Crude Oil RVP 5)
T ($^{\circ}R$)	520	Annual average temperature (60 $^{\circ}F$)
L_L (lb/1,000 gal)	1.366	--
Loading (bbl/day)	513.9	Total production from well (including a decline factor of 40% to account for the decrease in production during the first year)
Loading (bbl/yr)	187,574	--
HAP Fraction (wt.)	0.15	Low Pressure Oil Sample

Truck Loading Emission Estimates

$$\begin{aligned}
 \text{VOC (TPY)} &= \frac{\text{Annual Production (bbl)}}{\text{yr}} \times \frac{42 \text{ (gal)}}{\text{bbl}} \times \frac{1}{1000} \times \frac{L_L \text{ (lb)}}{1,000 \text{ gallon}} \\
 &\times \frac{1 \text{ (ton)}}{2,000 \text{ (lb)}} = \mathbf{5.38} \quad \text{Ton VOC/yr}
 \end{aligned}$$

$$\begin{aligned}
 \text{VOC (lb/hr)} &= \frac{\text{VOC (ton)}}{\text{yr}} \times \frac{2,000 \text{ (lb)}}{1 \text{ (ton)}} \times \frac{1 \text{ yr}}{1,460 \text{ hrs}} \\
 &= \mathbf{7.37} \quad \text{lb VOC/hr}
 \end{aligned}$$

$$\text{HAP (TPY)} = \frac{\text{VOC (ton)}}{\text{yr}} \times \text{HAP Fraction} = \mathbf{0.81} \quad \text{Ton HAP/yr}$$

$$\text{HAP (lb/hr)} = \frac{\text{VOC (lb)}}{\text{hr}} \times \text{HAP Fraction} = \mathbf{1.11} \quad \text{lb HAP/hr}$$

RMR-S Snake Charmer Draw Roger Leo Fed 3875-20-29-1FH 20150520 EP Tanks.txt

* Project Setup Information

*

Project File :
\\tsclient\M\StoV\SMEnergy-Air\ProjectDocuments\AirPermitCompliance\Wyoming\PowderRi
verBasin\Permits\RogerLeoFed 3875\Roger Leo Fed E&P Tanks.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 98.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : Roger Leo Fed (Allemand sample)
Well Name : SM Energy
Date : 2015.05.18

* Data Input

*

Separator Pressure : 28.00[psig]
Separator Temperature : 66.00[F]
Ambient Pressure : 12.00[psia]
Ambient Temperature : 60.00[F]
C10+ SG : 0.7409
C10+ MW : 152.16

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0453
4	N2	0.0000
5	C1	0.7862
6	C2	1.9621
7	C3	5.1680
8	i-C4	1.4954
9	n-C4	5.3805
10	i-C5	3.7862
11	n-C5	4.5463
12	C6	5.8584
13	C7	22.1463
14	C8	9.6358
15	C9	7.2007
16	C10+	16.2578
17	Benzene	0.8710
18	Toluene	3.7437
19	E-Benzene	0.3641
20	Xylenes	4.3996
21	n-C6	5.2991
22	224Trimethylp	1.0535

-- Sales Oil

```

*****
*****
*      Calculation Results
*
*****
*****

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Page 2

RMR-S Snake Charmer Draw Roger Leo Fed 3875-20-29-1FH 20150520 EP Tanks.txt

mol %						
1 H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
3 CO2	44.01	0.0453	0.0114	0.0000	0.7772	0.1334
0.3590						
4 N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
5 C1	16.04	0.7862	0.0788	0.0000	16.0766	0.9188
6.2302						
6 C2	30.07	1.9621	0.8276	0.0003	26.4839	9.6462
15.5462						
7 C3	44.10	5.1680	3.9022	0.1412	32.5274	43.9932
39.9755						
8 i-C4	58.12	1.4954	1.3708	0.6122	4.1887	9.4568
7.6108						
9 n-C4	58.12	5.3805	5.1348	3.5340	10.6917	22.1990
18.1668						
10 i-C5	72.15	3.7862	3.8260	3.7700	2.9259	4.4226
3.8982						
11 n-C5	72.15	4.5463	4.6384	4.7230	2.5559	3.7362
3.3226						
12 C6	86.16	5.8584	6.0781	6.5007	1.1088	1.5738
1.4108						
13 C7	100.20	22.1463	23.1099	25.0963	1.3189	1.9358
1.7196						
14 C8	114.23	9.6358	10.0737	10.9941	0.1702	0.2631
0.2306						
15 C9	128.28	7.2007	7.5319	8.2318	0.0414	0.0716
0.0610						
16 C10+	152.16	16.2578	17.0089	18.6009	0.0219	0.0395
0.0333						
17 Benzene	78.11	0.8710	0.9059	0.9753	0.1163	0.1664
0.1488						
18 Toluene	92.13	3.7437	3.9108	4.2592	0.1313	0.1968
0.1739						
19 E-Benzene	106.17	0.3641	0.3808	0.4159	0.0040	0.0062
0.0054						
20 xylenes	106.17	4.3996	4.6012	5.0267	0.0412	0.0655
0.0570						
21 n-C6	86.18	5.2991	5.5087	5.9221	0.7690	1.1021
0.9853						
22 2,2,4-Trimethylp	114.24	1.0535	1.0999	1.1963	0.0499	0.0730
0.0649						

MW		98.65	101.30	105.94	41.30	51.85
48.15						
Stream Mole Ratio		1.0000	0.9558	0.8738	0.0442	0.0820
0.1262						
Heating Value	[BTU/SCF]				2342.74	2920.67
2718.16						
Gas Gravity	[Gas/Air]				1.43	1.79
1.66						
Bubble Pt. @ 100F	[psia]	51.19	20.89	5.65		
RVP @ 100F	[psia]	24.62	14.92	5.38		

Page 2-----E&P TANK

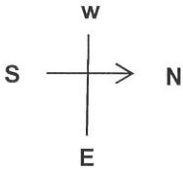
Spec. Gravity @ 100F 0.673 0.677 0.683

RMR-S Snake Charmer Draw Roger Leo Fed 3875-20-29-1FH 20150520 EP Tanks.txt

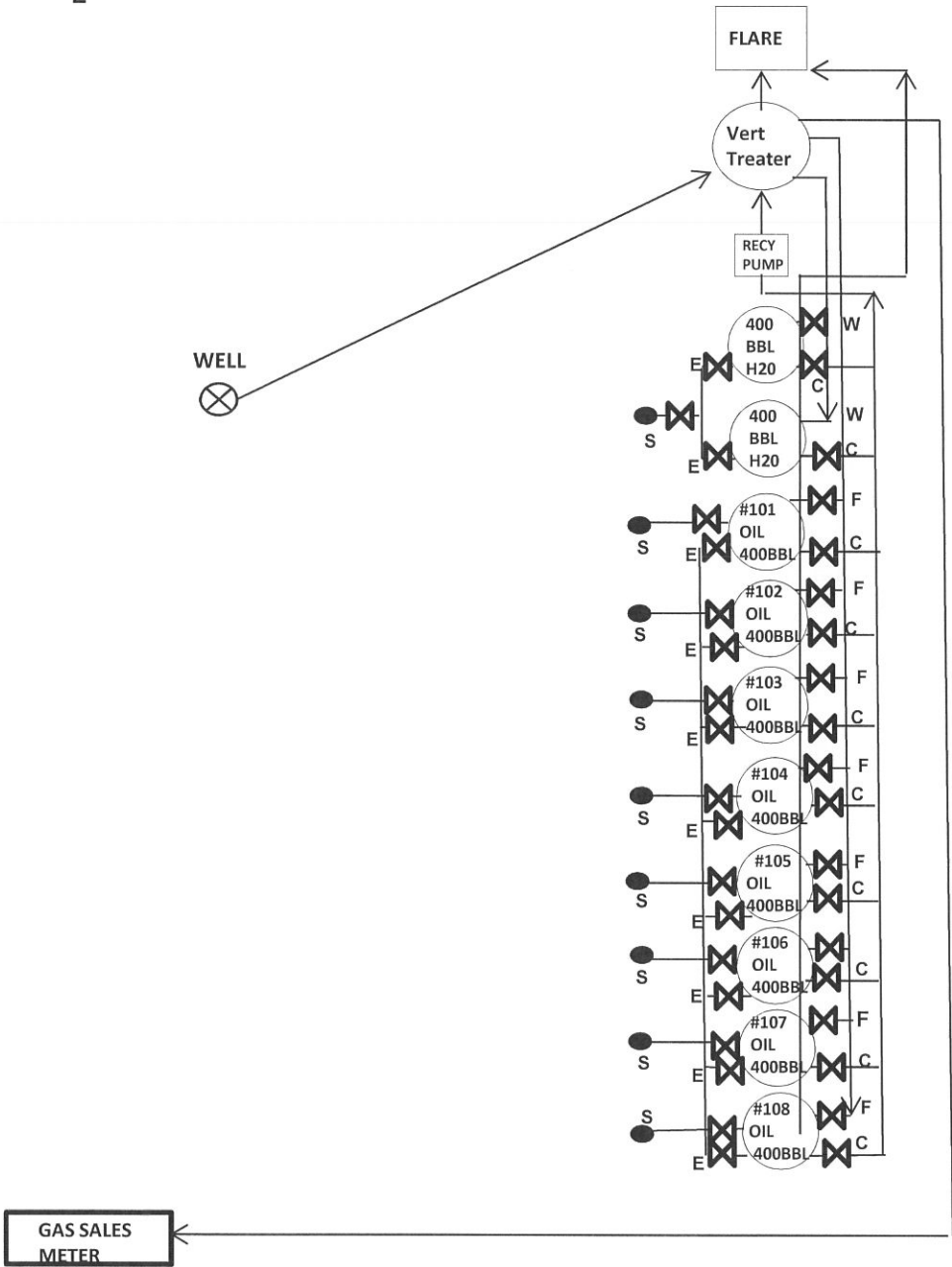
SM ENERGY CO. SITE SECURITY DIAGRAM:
WELL NO: ROGER LEO FED 3875-20-29-1FH LEASE NO: WYW181101 & WYW180165 FIELD NAME: SNAKE CHARMER DRAW FIELD LOCATION: NENE SEC 20-T38N-R75W COUNTY: CONVERSE CO. STATE: WY

SITE FACILITY PLAN LOCATED AT:
SM ENERGY CO
550 N 31ST ST, SUITE 500
BILLINGS, MT 59103

VALVE SEALING DETAIL	PRODUCTION OR NORMAL OPERATIONS	RECYCLING	SALES
C=RECYCLING	O/C	O	SC
E=EQUALIZER	O/C	O/C	SC
F=PRODUCTION	O	O/C	SC
I=INJECTION	SC	SC	O
WHERE: O – OPEN, SO – SEALED OPEN, C – CLOSED, SC – SEALED CLOSED, O/C – OPEN OR SEALED			



NOT TO SCALE



QUESTAR APPLIED TECHNOLOGY

1210 D. Street, Rock Springs, Wyoming 82901

(307) 352-7292

LIMS ID:	N/AS	Description:	Allemand 12-2
Analysis Date/Time:	4/6/2015 2:33 PM	Field:	Allemand
Analyst Initials:	PRP	ML#:	SM Energy
Instrument ID:	Instrument 1	GC Method:	Quesbtex
Data File:	QPC24.D	GPA 2286	
Date Sampled:	4/1/2015		

Component	Mol%	Wt%	LV%
Methane	76.8150	56.5749	67.0104
Ethane	12.0607	16.6496	16.6456
Propane	5.6270	11.3916	7.9849
Isobutane	0.6785	1.8106	1.1431
n-Butane	1.5859	4.2318	2.5748
Neopentane	0.0122	0.0405	0.0241
Isopentane	0.4212	1.3950	0.7939
n-Pentane	0.3867	1.2809	0.7213
2,2-Dimethylbutane	0.0048	0.0190	0.0103
2,3-Dimethylbutane	0.0363	0.1436	0.0766
2-Methylpentane	0.0872	0.3450	0.1863
3-Methylpentane	0.0535	0.2116	0.1124
n-Hexane	0.1200	0.4748	0.2541
Heptanes	0.3889	1.7036	0.7990
Octanes	0.0717	0.3752	0.1847
Nonanes	0.0836	0.4546	0.2082
Decanes plus	0.0261	0.1704	0.0825
Nitrogen	0.5252	0.6754	0.2965
Carbon Dioxide	1.0155	2.0519	0.8913
Oxygen	0.0000	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000
Global Properties	Units		
Gross BTU/Real CF	1293.0	BTU/SCF at 60°F and 14.73 psia	
Sat. Gross BTU/Real CF	1269.9	BTU/SCF at 60°F and 14.73 psia	
Gas Compressibility (Z)	0.9961		
Specific Gravity	0.7528	air=1	
Avg Molecular Weight	21.782	gm/mole	
Propane GPM	1.542151	gal/MCF	
Butane GPM	0.720159	gal/MCF	
Gasoline GPM	0.582910	gal/MCF	
26# Gasoline GPM	1.090623	gal/MCF	
Total GPM	6.376388	gal/MCF	
Base Mol%	99.534	%v/v	
Sample Temperature:	66	°F	
Sample Pressure:	28	psig	
H2S Length of Stain Tube	N/A	ppm	

Component	Mol%	Wt%	LV%
Benzene	0.0176	0.0632	0.0254
Toluene	0.0433	0.1833	0.0747
Ethylbenzene	0.0034	0.0165	0.0067
M&P Xylene	0.0273	0.1333	0.0545
O-Xylene	0.0071	0.0348	0.0140
2,2,4-Trimethylpentane	0.0106	0.0557	0.0275
Cyclopentane	0.0000	0.0000	0.0000
Cyclohexane	0.0757	0.2925	0.1327
Methylcyclohexane	0.0947	0.4271	0.1961
Description:	Allemand 12-2		

GRI GlyCalc Information

Component	Mol%	Wt%	LV%
Carbon Dioxide	1.0155	2.0519	0.8913
Hydrogen Sulfide	0.0000	0.0000	0.0000
Nitrogen	0.5252	0.6754	0.2965
Methane	76.8150	56.5749	67.0104
Ethane	12.0607	16.6496	16.6456
Propane	5.6270	11.3916	7.9849
Isobutane	0.6785	1.8106	1.1431
n-Butane	1.5859	4.2318	2.5748
Isopentane	0.4334	1.4355	0.8180
n-Pentane	0.3867	1.2809	0.7213
Cyclopentane	0.0000	0.0000	0.0000
n-Hexane	0.1200	0.4748	0.2541
Cyclohexane	0.0757	0.2925	0.1327
Other Hexanes	0.1818	0.7192	0.3856
Heptanes	0.1470	0.6818	0.3426
Methylcyclohexane	0.0947	0.4271	0.1961
2,2,4 Trimethylpentane	0.0106	0.0557	0.0275
Benzene	0.0176	0.0632	0.0254
Toluene	0.0433	0.1833	0.0747
Ethylbenzene	0.0034	0.0165	0.0067
Xylenes	0.0344	0.1681	0.0685
C8+ Heavies	0.1436	0.8156	0.4002
Subtotal	100.0000	100.0000	100.0000
Oxygen	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000

QUESTAR APPLIED TECHNOLOGY

1210 D. Street, Rock Springs, Wyoming 82901

(307) 352-7292

LIMS ID:	N/A	Description:	Allemand 12-2
Analysis Date/Time:	4/7/2015 7:10 AM	Field:	Allemand
Analyst Initials:	PRP	ML#:	SM Energy
Sample Temperature:	66	GC Method:	Quesliq GPA 2186
Sample Pressure:	28	Data File:	QPC31.D
Date Sampled:	4/1/2015	Instrument ID:	1

Component	Mol%	Wt%	LV%
Methane	0.7862	0.1270	0.2996
Ethane	1.9621	0.5939	1.1800
Propane	5.1680	2.2941	3.2016
Isobutane	1.4954	0.8750	1.1004
n-Butane	5.3805	3.1482	3.8143
Neopentane	0.0379	0.0276	0.0327
Isopentane	3.7483	2.7225	3.0825
n-Pentane	4.5463	3.3020	3.7057
2,2-Dimethylbutane	0.1086	0.0942	0.1019
2,3-Dimethylbutane	1.1298	0.9801	1.0412
2-Methylpentane	2.9119	2.5262	2.7179
3-Methylpentane	1.7081	1.4818	1.5676
n-Hexane	5.2991	4.5971	4.9002
Heptanes	23.0173	22.3981	21.5425
Octanes	14.4330	15.7297	14.8370
Nonanes	11.9644	14.3886	13.2530
Decanes plus	16.2578	24.6941	23.6045
Nitrogen	0.0000	0.0000	0.0000
Carbon Dioxide	0.0453	0.0201	0.0174
Total	100.0000	100.0000	100.0000

Global Properties

Units

Avg Molecular Weight	99.3356 gm/mole
Pseudocritical Pressure	450.09 psia
Pseudocritical Temperature	500.98 degF
Specific Gravity	0.70785 gm/ml
Liquid Density	5.9011 lb/gal
Liquid Density	247.85 lb/bbl
Specific Gravity	2.9053 air=1
SCF/bbl	950.61 SCF/bbl
SCF/gal	22.6335 SCF/gal
MCF/gal	0.0226 MCF/gal
gal/MCF	44.198 gal/MCF
Net Heating Value	4917.7 BTU/SCF at 60°F
Net Heating Value	18893.2 BTU/lb at 60°F
Gross Heating Value	5349.2 BTU/SCF at 60°F
Gross Heating Value	20325.9 BTU/lb at 60°F
Gross Heating Value	121411.7 BTU/gal at 60°F
API Gravity	68.4
MON	63.2
RON	65.0
RVP	72.025 psia

Component	Mol%	Wt%	LV%
Benzene	0.8710	0.6849	0.5480
Toluene	3.7437	3.4726	2.8190
Ethylbenzene	0.3641	0.3891	0.3160
M&P Xylene	3.3257	3.5544	2.8958
O-Xylene	1.0739	1.1477	0.9183
2,2,4-Trimethylpentane	1.0535	1.2114	1.1906

Data File:

Allemand 12-2

Page #2

GRI E&P TANK INFORMATION

Component	Mol%	Wt%	LV%
H2S	0.0000	0.0000	0.0000
O2	0.0000	0.0000	0.0000
CO2	0.0453	0.0201	0.0174
N2	0.0000	0.0000	0.0000
C1	0.7862	0.1270	0.2996
C2	1.9621	0.5939	1.1800
C3	5.1680	2.2941	3.2016
IC4	1.4954	0.8750	1.1004
NC4	5.3805	3.1482	3.8143
IC5	3.7862	2.7501	3.1152
NC5	4.5463	3.3020	3.7057
Hexanes	5.8584	5.0823	5.4286
Heptanes	22.1463	21.7132	20.9945
Octanes	9.6358	11.0457	10.8274
Nonanes	7.2007	9.2974	9.1229
Benzene	0.8710	0.6849	0.5480
Toluene	3.7437	3.4726	2.8190
E-Benzene	0.3641	0.3891	0.3160
Xylene	4.3996	4.7021	3.8141
n-C6	5.2991	4.5971	4.9002
2,2,4-Trimethylpentane	1.0535	1.2114	1.1906
C10 Plus			
C10 Mole %	16.2578	24.6941	23.6045
Molecular Wt.	152.1604		
Specific Gravity	0.7409		
Total	100.00	100.00	100.00

Questar Energy Services

Applied Technology Services

API Gravity
Reid Vapor Pressure

Producer: SM Energy
Well Name: Allemand 12-2
Tank Number: 4
Tank Temp *F: 46*
Field: Wildcat
County and State: Converse, WY
Corrected API Gravity: 43.9 @ 60°F
RVP 5.4#
Date Sampled: 4/1/15
Date Analyzed: 4/6/15
Sampled By: Drebin
Analyzed By: Putnam

Questar Applied Technology Services

1210 D Street
Rock Springs, Wyoming 82902
Phone: (307) 352-7292
Fax: (307) 352-7326

WATER ANALYSIS REPORT

COMPANY: SM Energy
FIELD: Allemand
COUNTY: Converse
STATE: Wyoming
WELL: Allemand 12-2

FORMATION:
SAMPLE POINT: H2O Dump Valve
TYPE OF WATER: Produced
DATE SAMPLED: 4-1-15
DATE ANALYZED: 4-10-15
ANALYZED BY: Putnam
SAMPLED BY: Dreben

DISSOLVED SOLIDS	mg / L
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CATIONS:	.
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Sodium, Na:	10,212
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Calcium, Ca:	704
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Magnesium, Mg:	423
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Barium, Ba:	N/A
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ANIONS:	
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Chloride, Cl:	18,000
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Sulfate, SO ₄ :	0
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Carbonate, CO ₃ :	0
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Bicarbonate, HCO ₃ :	400
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Iron, Fe:	25
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Sulfide, H ₂ S:	N/A
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TOTAL DISSOLVED:	29,764
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OTHER PROPERTIES:	
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pH:	6.85
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Specific Gravity, 60/60F:	1.0262
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Resistivity: (ohms/meter)	0.208
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Sample Temperature:	71°F
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REMARKS & RECOMMENDATIONS:	
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Daily Estimated Production History

Displaying Prod Estimates for 2 months
ending 5/16/2015.

Region: Billings
Bus Area: S Rockies Gillette

Route: BILWY01

Facility: ROGER LEO FED 3875-2029-1FH - FACILITY

COMP: ROGER LEO FED 3875-2029-1FH [#1512687-000]

State: Wyoming

County: CONVERSE

Field: SNAKE CHARMER DRAW

Prospect: DEEP POWDER /
CONVERSE WY

Operator: SM ENERGY COMPANY

Prod Stat: Producing

Prod Dt	Leak	Prod Cd	PRODUCTION			Sales		Lease Use Gas		Injection		Hrs		DownTime Reason	Choke	Pressure (Psig)		Fluid Level	API		Treater Temp	
			Oil BBL	Wtr BBL	Gas MCF	Oil	Gas	Flare	Fuel	Vent	Gas	Water	Up			Dn	Tbg		Csg	Grav		WH
04/17/2015	F	D	0	0	0	0	0	0	0	0	0	0	0	24 WORKOVER	0	1625	350				63	149
04/22/2015	F	U	560	2085	700	0	512	188	0	0	0	0	8	24 WORKOVER	0	1450					80	140
04/3/2015	T	U	805	3060	1421	0	818	603	0	0	0	0	24	0	1	1080					84	135
04/4/2015	F	U	1028	2935	1682	1198	1154	528	0	0	0	0	24	0	1	1120		39.3			82	150
04/5/2015	F	U	785	2805	1733	472	898	835	0	0	0	0	24	0	1	1020		39.3			92	150
04/6/2015	F	U	1219	2430	1623	682	1328	265	30	0	0	0	24	0	1	1000		39.3			81	148
04/7/2015	F	U	77	245	176	1430	138	38	0	0	0	0	21	3 Wellhead Problems	1	1000		39.5			0	100
04/8/2015	F	U	585	1510	913	473	665	218	30	0	0	0	13	11 Wellhead Problems	1	1100		39.3			74	125
04/9/2015	F	U	1294	2595	1913	0	1787	96	30	0	0	0	17	7 Wellhead Problems	1	1020					96	135
04/10/2015	F	U	1143	1660	1712	1448	1666	16	30	0	0	0	24	0	1	930		40.8			93	135
04/11/2015	F	U	1109	1905	1715	1685	1685	0	30	0	0	0	24	0	1	890		40.0			94	130
04/12/2015	F	U	1053	1650	1604	963	1574	0	30	0	0	0	24	0	1	950		39.7			96	140
04/13/2015	F	U	1201	1630	1752	1456	1722	0	30	0	0	0	24	0	1	940		39.5			96	140
04/14/2015	F	U	1020	1540	1565	719	1483	52	30	0	0	0	24	0	1	780		39.3			96	135
04/15/2015	F	U	1110	1270	1664	1200	1634	0	30	0	0	0	24	0	1	750		40.5			90	120
04/16/2015	F	U	1187	1400	1410	1205	1200	180	30	0	0	0	24	0	1	725		39.8			98	130
04/17/2015	F	U	862	1300	1676	927	1465	181	30	0	0	0	24	0	1	700		40.7			100	130
04/18/2015	F	U	872	895	1255	1260	1169	56	30	0	0	0	24	0	0	850		40.5			78	145
04/19/2015	F	U	655	841	935	239	801	104	30	0	0	0	24	0	1	680		40.4			94	135
04/20/2015	F	U	1009	2599	1677	963	1474	173	30	0	0	0	24	0	1	690		40.0			92	135
04/21/2015	F	U	870	1414	1174	952	1144	0	30	0	0	0	24	0	1	680		39.9			92	135
04/22/2015	F	U	994	433	1269	1197	1239	0	30	0	0	0	24	0	1	680		40.0			98	135
04/23/2015	F	U	825	0	1150	718	1105	15	30	0	0	0	24	0	1	650		39.3			92	135
04/24/2015	F	U	865	206	1223	955	1151	42	30	0	0	0	24	0	1	620		40.1			88	130
04/25/2015	F	U	825	846	1285	974	1255	0	30	0	0	0	24	0	1	600		40.7			80	130
04/26/2015	F	U	711	718	1105	0	1075	0	30	0	0	0	19	5 High SW Tank Level	1	1150					45	120
04/27/2015	F	U	171	84	275	672	260	0	15	0	0	0	10	14 Other Weather	1	1300		40.8			49	120
04/28/2015	F	U	946	779	1398	953	1368	0	30	0	0	0	24	0	1	550		40.5			58	130
04/29/2015	F	U	839	758	1308	952	1266	12	30	0	0	0	24	0	1	600		39.3			80	130
04/30/2015	F	U	846	815	1310	946	1275	5	30	0	0	0	24	0	1	540		39.3			82	130
Monthly Total	1	29	25464	40408	38623	24636	34313	3607	703	0.00	0	0	640	80		889.0	350.0	39.9			80.5	133.4
Prod Dy Avg:			878	1393	1332	850	1183	124	24	0	0	0	21	3	1	400		39.8			82	130
05/1/2015	F	U	892	894	1360	954	1330	0	30	0	0	0	24	0	1	400		39.6			80	130
05/2/2015	F	U	893	883	1325	949	1227	68	30	0	0	0	24	0	1	410		39.3			78	130
05/3/2015	F	U	877	872	1360	702	1252	78	30	0	0	0	24	0	1	460		39.3			82	130
05/4/2015	F	U	885	785	1307	942	1278	0	29	0	0	0	24	0	1	450		40.1			82	130
05/5/2015	F	U	1062	661	1273	943	1244	0	29	0	0	0	24	0	1	310		40.7			68	130
05/6/2015	F	U	826	741	1147	723	1022	95	30	0	0	0	24	0	1	350		39.3			80	125
05/7/2015	F	U	447	735	555	696	526	0	29	0	0	0	24	0	1	325		39.9			69	130
05/8/2015	F	U	802	682	1123	938	1093	0	30	0	0	0	24	0	1	350		39.9			70	130
05/9/2015	F	U	27	0	327	0	316	0	11	0	0	0	7	17 Other Weather	1	350					70	130

AVM140Zone_Alloc_Dly_Estimated_Prod_History

